

COMPUTER PROCESSING OF SALES DATA ON A LIVESTOCK AUCTION MARKET

Marketing Research Report No. 980

**Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
In Cooperation With
Computational Services Center University of Missouri**

PREFACE

This report provides the livestock auction market industry with data and guidelines that could be helpful in increasing the efficiency of auction market operations. Primarily, the study deals with the programing of a computer, computer processing of sales data, and the preparation of records of sales transactions for the buyers, sellers, and the market.

The authors acknowledge the cooperation and assistance of the management and staff of the Central Missouri Livestock Auction, Inc., Mexico, Mo. The computer system was installed and tested on this market under the terms of a Memorandum of Understanding with the Transportation and Facilities Research Division (TFRD), Agricultural Research Service.

The study was made under a cooperative agreement between TFRD and the Computational Services Center, University of Missouri. The research was conducted under the general supervision of Tarvin F. Webb, Investigations Leader, TFRD; and Roy F. Keller, formerly Director, and Leon L. Johnson, Assistant Director, Computational Services Center.

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By Herman F. Mayes, *agricultural engineer, North Central Region, Columbia, Mo., Agricultural Research Service*
Leon L. Johnson, *Assistant Director, Computational Services Center, University of Missouri*
and Tarvin F. Webb, *Agricultural Economist, Agricultural Marketing Institute, Northeastern Region, Beltsville, Md.*

SUMMARY

An electronic digital computer has been installed in the office of a livestock auction market to test the computer's ability to handle all sales transactions that occur in the market.

The computer program, written in machine language, covers the preparation of sellers' invoices and checks, buyers' statements, truckers' checks, and the end-of-the-sales-day summary. These records provide all the information required by the Packers and Stockyards Act.

The system, installed on the premises of the Central Missouri Livestock Auction, Inc., Mexico, Mo., uses an IBM 1130 computer, a card reader, and a list printer. All information is fed into the computer from punched cards. A seller's invoice and check are prepared automatically when the total number of livestock sold under his account number equals the number checked in. Deductions are made for the Livestock and Meat Board, marketing changes, and inspection fees. If applicable, de-

ductions are also made for veterinary service, transportation, and feeding. Buyers' statements provide data on weight and price, and include charges, where applicable, for feeding, transportation, and commission. At the close of the sale, a summary matrix is printed. This matrix (1) tabulates the dollar volume for buyers and sellers under each species of livestock sold, (2) tabulates the dollar volume for each charge made and commission collected, and (3) provides a listing of all checks written. The computer is also used by the market for processing payroll and other market records.

The computer system was found to minimize the possibility of error in the computation and preparation of records and accounts, speed up payment for animals following their sale, and provide accurate permanent records of all business transactions. The system further reduces clerical labor by handling routine accounting tasks, such as payrolls.

INTRODUCTION

Livestock markets are either auction markets, terminal markets, or terminal markets with part of their sales handled through an auction. At auction markets, livestock are physically assembled and sold through public bidding. At terminal markets, livestock are physically assembled and consigned to a commission firm. The commission firm sells the livestock to the highest bidder with each bid solicited privately between the commission agent and a prospective buyer.

Livestock auction markets have had a phenomenal growth in the 20th century. Since the early 1930's they have been a major market for livestock. The number of

livestock auction markets reached a high of 2,512 in 1952 but has since declined to about 1,700. However, during the same period, the number of cattle sold at auction has increased from about 25 million to about 40 million.

The movement of livestock through an auction market requires facilities for receiving, holding, selling, and loading out animals. Receiving, holding, and loading out facilities include some or all of the following: Truck docks, chutes, chute pens, tagging chutes, holding pens, alleys, overhead walkways, dipping vats, feed racks, and water troughs.

Alleys or chutes are used to connect yard facilities to the sales barn. In the sales barn are the sales ring; seating space for buyers, sellers, and spectators; auctioneer's booth; scales; offices; and, generally, a lunchroom or snack bar.

Most auction markets operate at least 1 day each week. The trend is toward holding sales several days per week. Ordinarily, livestock are delivered to the market on the day they are to be sold. Most market operators have no set deadline for receiving livestock. Upon arrival at the market, the livestock are unloaded and checked by yard personnel who record number and species consigned. To maintain identification, the livestock are usually tagged or marked before being assigned to pens.

Livestock consigned at auction markets are sold either by weight on a price-per-pound basis or by the head.

All posted markets that sell livestock are required by the Packers and Stockyards Act to prepare documents describing sales transactions. These sales documents must be prepared for both the buyer and seller, and the market must keep copies of them for its records.

The information required on sales documents is listed in the regulations of the Packers and Stockyards Admin-

istration (P&SA), U.S. Department of Agriculture. Posted market operators are aware of the sales information needed on these documents.

The sales documents generally consist of a buyer's statement, scale tickets, seller's invoice, check payable to the seller, and a summary of each day's activity. The exact form of the above documents varies from market to market. These documents are usually prepared by a staff of office employees.

The approximately 1,700 livestock auction markets in the United States process sales data in practically the same way now as in the early 1930's. Sales data are recorded and transferred manually from the sales arena to the market office where office personnel make all computations and prepare the necessary records and accounts, including the sellers' checks. Based on observations and the limited analyses available, costs of preparing records and accounts amount to about 20 percent of the total labor costs.

The computer system described and evaluated in this report is an attempt to improve the efficiency of handling and processing sales data and other clerical work on a livestock auction market.

CONVENTIONAL DATA HANDLING METHODS

The 1,700 livestock auction markets operating in the United States have tried various methods of handling and processing the clerical work involved in a livestock auction. Before this research on computer programming of sales data, these methods could be classified generally as manual, punchcard, or accounting machines.

Manual

Preparation of the seller's invoice and the check payable to the seller varies from one market to another. Some of the markets that sell only 1 day a week and have a low volume depend entirely on two or three office employees to do this. The most common procedure in use at present is for one or two office employees to receive all scale tickets from the weighmaster or sales ring. An invoice is then prepared, usually by hand, and in a few cases by typewriter, with the deductions being listed and all calculations made on a desk-type adding machine or calculator. The invoice is then passed to another employee who verifies it and prepares a check.

The scale tickets are passed from the clerk who prepared the sellers' invoices to another clerk who is responsible for the buyers' statement. A buyer statement is started whenever the scale tickets of the first draft of animals purchased reach the office. These statements are kept in a holding file as the sale progresses. As each succeeding scale ticket having the same buyer's name or number reaches the clerk, she makes the corresponding entry on that particular statement. Generally, a buyer may settle his account with the office at any time during the sale. At that time any charges to be made against the buyer are entered on his statement.

The day's sales activity is summarized by tabulating all of the sellers' invoices and charges associated with these invoices and all of the buyers' statements and the charges against the buyers.

As the volume of livestock being sold and the number of days that sales are held have increased, additional office personnel and faster calculators have been required to meet the demands of the sellers and buyers.

Some markets have resorted entirely to the hiring of more personnel, but there is a practical limit to this approach.

Punchcards

Some markets have developed sales data systems using punched cards. All information on the scale tickets is punched onto a standard size, 80-column punchcard. These cards are then fed into an electrically operated card calculator, which performs the necessary calculations and punches this information into the unused columns of the card.

For each seller's invoice, a name and address card is inserted into a card processor ahead of cards containing the sales data. After the cards containing the sales data are inserted, any cards for special charges are inserted. The information on each punched card is extracted and printed out on a seller's invoice form. One member of the office personnel then takes this invoice and prepares by hand, or on a typewriter, the checks necessary to cover the invoice.

All cards representing scale tickets are then removed and fed into a card sorter where they are sorted according to buyer number. These cards are then filed manually in numerical order in a large tub file. When a buyer is ready to settle his account, the clerk at the window or counter takes his name, address, buyer number, and number of drafts purchased. This information is checked against the corresponding buyer number in the tub file. If all the drafts have been received from the sales ring, the draft cards are removed from the tub file. These are then inserted into the card processor along with a name and address card. Information concerning a buyer's purchases is punched onto his name and address card when he is ready to settle his account. A file of buyers' name and address cards is maintained for the regular buyers.

The day's sales transactions are summarized by re-running all punched cards to develop and print a portion of the total daily summary. Whenever a different type of summary is desired, all punched draft cards are fed into the card sorter and sorted. Control boards can be changed on the card processor to permit the processing of different columns of data from the punched draft cards.

The use of a hand calculator is also necessary to complete the summary of the day's activity.

Accounting Machines

Some attempts have been made to use account posting machines to prepare invoices and statements of livestock market transactions. These machines prepare only the invoice or statement with no retention of information on a card form. To prepare a summary of the day's operation, the individual amounts on each invoice or statement have to be totaled either manually or by use of a calculator.

At least one major livestock market, a terminal stockyard company, is using an electronic accounting machine for preparing the records required by P&SA.

The stockyard company receives daily information on the volume of livestock handled by each of the commission firms doing business on the stockyards. This information is punched on standard punchcards by the stockyard company. The punched cards are processed through an electronic accounting machine, which prepares records.

The commission firm handles all sales and prepares checks paying the individual sellers. The commission firm also collects from the buyer the amount of money needed to pay for the livestock he has purchased and for any additional charges incurred.

The stockyard company uses the punched cards to prepare a weekly billing, charging each commission firm the yardage fees it is required to pay.

The punched cards are used to prepare a daily listing of each species handled through the stockyards. This tabular listing includes date, buyer number, seller number (which is a commission firm), account number, scale number where livestock were weighed, number of drafts, and cumulative total of the number of head.

A weekly recap of each species by commission charges is prepared.

The monthly recap of all livestock handled through the stockyard is prepared from the punched cards. Livestock handled are tabulated on the basis of yardage, salable receipts or total receipts, marketing charges, and species of livestock. This monthly recap is also prepared for each commission firm and thus reflects the total business done by the firm during the month.

One disadvantage of this system is that the punched cards must be re-sorted by a card sorter after each item is tabulated. This means that the cards must be handled several times in preparing daily, weekly, and monthly summaries.

PROCESSING SALES DATA BY ELECTRONIC COMPUTER

Before a computer system and a computer program could be developed to process the sales transactions of a livestock market it was necessary to analyze the volume of business being handled by the market. This analysis provided information on the handling, processing, and volume of sales data. From this analysis, the requirements for data transactions and data storage were developed.

The requirements also included information on the density of animals sold with respect to buyer and seller. This animal density is a cumulative frequency count of the sales transaction, number of head, number of head consigned by each seller, and number of head purchased by each buyer. The animal density was determined for each type of livestock sold.

After the above analysis was completed, a computer was leased that would meet the requirements. The computer system leased and installed at the Central Missouri Livestock Auction, Inc., was an IBM Model 1130. This system consisted of an 1131 central processor with an 8K core memory, console printer, card reader and card punch, and disk drive. The disk cartridge was an IBM Model 2315. The card reader was a Model 1442 capable of reading 300 cards per minute and punching 80 cards per minute. The printer was a Model 1132 capable of printing 80 lines per minute.

The flow of information on the livestock auction market with the computer installed in the office is shown in figure 1. This flow chart illustrates the area from which information is forwarded to the office. The processing of this information within the office and the computer is shown along with the computer system components. The flow of invoices, statements, and checks from the computer is also shown. A pictorial view of the essential areas of the market is shown in figure 2.

Assembling and Processing Data

Livestock delivered to the unloading dock of the Central Missouri Livestock Auction, Inc., are described on a livestock delivery ticket. These tickets are serially numbered and color coded for different species of livestock. The owner's name is recorded at the top of the ticket. Livestock are described in the center half of the ticket by sex, color, and age, along with any directions for feeding or selling. The person responsible for delivering the livestock signs the ticket at the bottom. Also, at the bottom of the ticket, the name of the trucking

firm hauling the livestock and the rate being charged for this service are listed, if applicable. One copy of the delivery ticket is given to the person delivering the livestock.

The original of the delivery ticket is forwarded to the office. The third copy, which is a hard copy, is retained with the livestock until they are sold. At this time, the third copy, along with the scale ticket or tickets, is forwarded to the office.

The original delivery ticket is used by the office to prepare punched cards. The punched cards are used to enter information into the computer. The first card to open a seller's account in the computer is a name and address card. This card contains the name and address of the seller and the proportion of the total amount due this seller, if more than one seller is involved. The seller's account number is also entered on this card. This account number is four digits in length. It is formed by combining the last three digits of the smallest serially

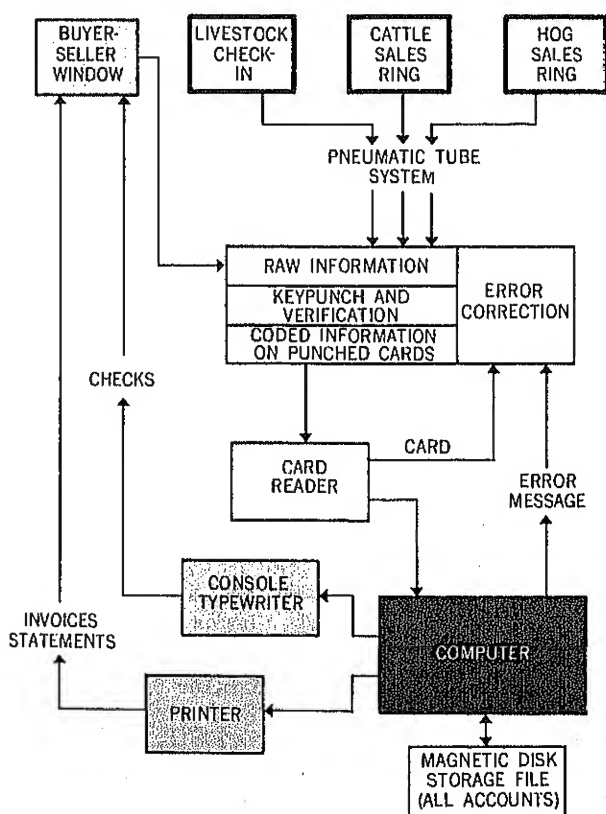
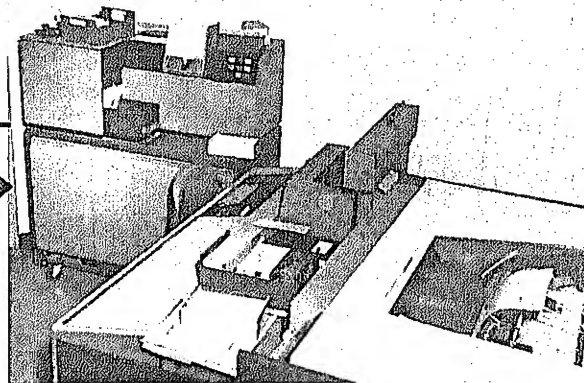
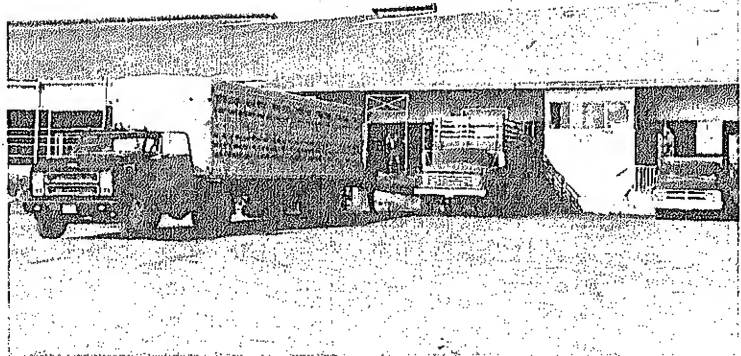


Figure 1.—Flow chart of information to and from the computer on a livestock auction market.

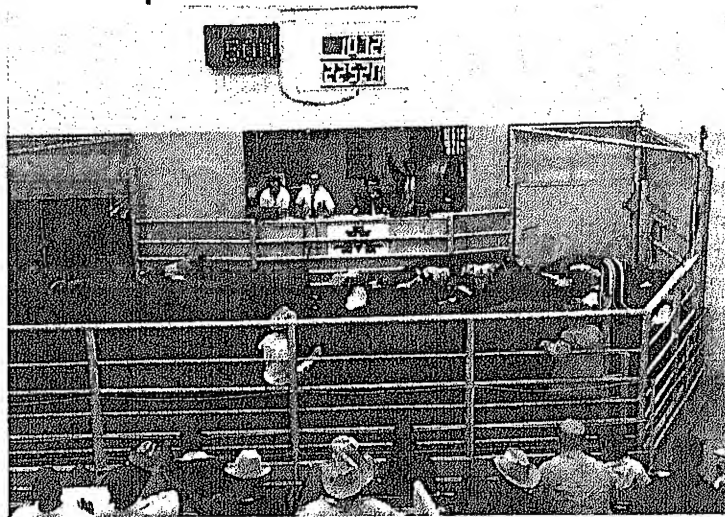
BUYER-SELLER WINDOW



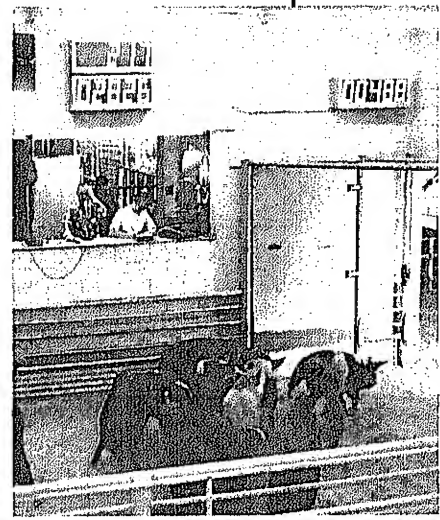
CHECK-IN AREA



COMPUTER



CATTLE SALES RING AREA



HOG SALES RING AREA

PN-2421

Figure 2.—Essential areas of a livestock auction market. Electronic computer to process sales data is located in the office. Data flow, shown by solid lines, is by pneumatic tube from above areas to the office. Punched cards are used to input sales data into computer. Invoices, checks, and statements move from computer to customers through the buyer-seller window, as shown by dashed line.

numbered check-in ticket assigned to this seller with a single digit to indicate type of livestock. The single digit assigned to indicate type uses "1" for cattle, "2" for feeder pigs, "3" for butcher hogs, and "4" for sheep. This digit is the first digit of the four-digit seller number. Thus it is possible to look at the seller number and know the type of livestock sold.

The next card fed into the card reader is the check-in ticket card (fig. 3). This card contains data obtained at the receiving dock. This data includes the check-in ticket number, seller number, check-in time, check-in date, number of days the livestock are to be fed, a code letter to delete charges for Livestock and Meat Board and inspection if they are to be deleted, and the number of head checked in at the receiving dock. It is possible to have more than one check-in ticket for a seller. One check-in ticket card is punched for each receiving ticket, but only one seller number is assigned to each type of livestock sold by a seller. If a seller has two types of livestock to sell, he will be assigned two seller numbers.

All special charges to be assessed the seller are punched on separate cards. Information punched to make a deduction for trucking is seller number, type of charge, amount or rate, number of head transported, and trucker's name. Information punched to make a deduction for feed is seller number, type of charge, number of days to be fed, and the number of head to be fed. In both cases the type of charge refers to flat fee (F), a charge by weight (W), or a charge by the head (H).

Veterinary charges are also deducted using separate cards. Information punched on these cards is seller number and the amount of the charge. All charges for veterinary service are flat charges.

Scale tickets originate in the sales booth and consist of a standard punchcard with special blank areas in which the sales clerk records sales data. The weight information is stamped on the card by inserting the card in the stamping slot on an electrically operated scale head. These cards are handed to the pen-back foreman, located in the sales booth, who records the pen number assigned to that particular buyer and in which the specified lot of livestock is penned. The cards are then forwarded by the pen-back foreman to the office through a pneumatic tube.

The scale tickets are inserted in a standard keypunch machine in the office. The previously recorded sales information is then punched on the card (fig. 4). Sales information includes the buyer number, seller number, pen number, number of units, number of head, total weight, a description of the livestock, and a punch to indicate if the sale is by the head. The description of the

livestock is made by making one or more punches in the column reserved for cattle, sheep, or hogs, whichever species is being sold. The various punches possible in these columns are described internally within the computer. These punched marks are stored internally until an invoice or statement is being prepared. For each single punch in columns 31, 32, or 33, a three-letter description code can be made. Some codes, however, require a double punch in the column. (See following tabulation.)

Cattle (Column 31)

<i>Punch</i>	<i>Abbreviation</i>	<i>Represents</i>
12	BLK	Black
11	WF	White Face
0	RON	Roan
1	STR	Steer
2	HFR	Heifer
3	COW	Cow
4	CAF	Calf
5	PAR	Pair (cow and calf)
6	BUL	Bull
7	REG	Registered
8	ASI	As Is Sale
9	INS	Insurance Claim

Sheep (Column 32)

<i>Punch</i>	<i>Abbreviation</i>	<i>Represents</i>
12	EWS	Ewes
0-1	W-LAMBS	Wool Lambs
2-3	C-LAMBS	Clipped Lambs
4	RAM	Bucks or Rams
6	E&L	Ewes and Lambs
8	ASI	As Is Sale
9	INS	Insurance Claim

Hogs (Column 33)

<i>Punch</i>	<i>Abbreviation</i>	<i>Represents</i>
12	HMP	Hampshire
11	BLK	Blacks
0	WHT	Whites
1	RED	Reds
2	BCH	Butcher
3	STK	Stockers
4	SOW	Sows
5	BOR	Boar
6	S&P	Sow and Pig
7	VAC	Vaccinated
8	ASI	As Is Sale
9	INS	Insurance Claim

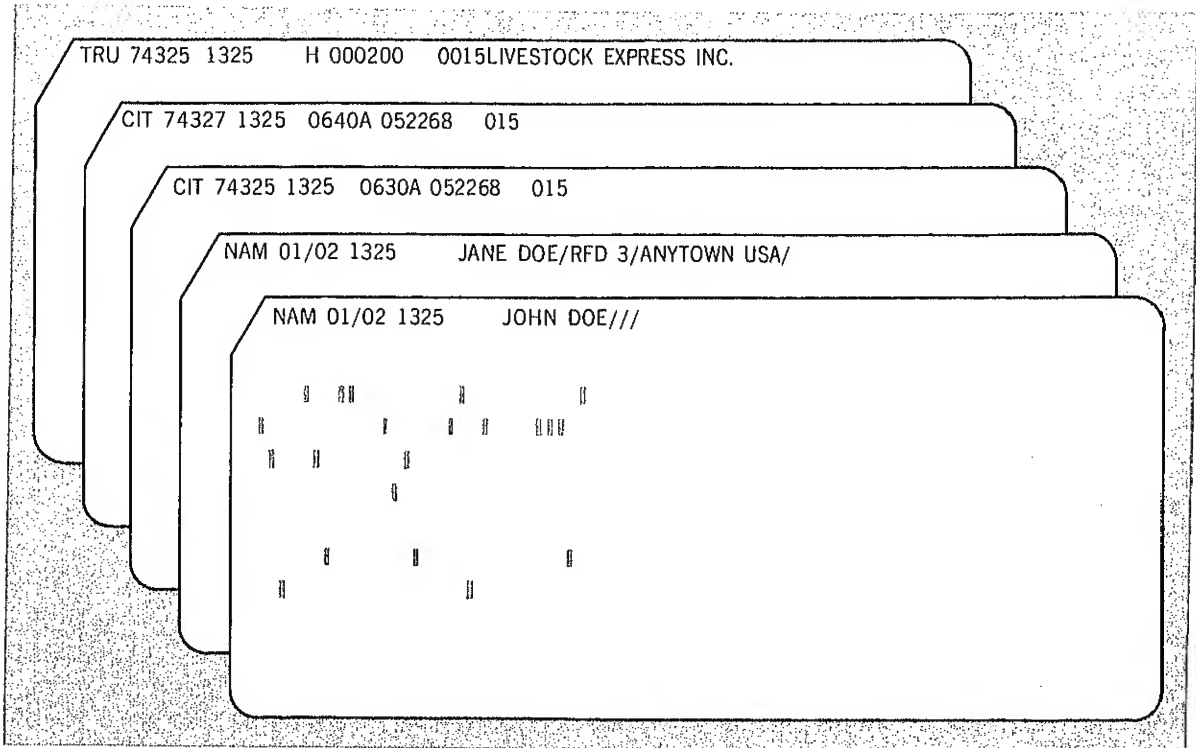


Figure 3.—Examples of punched cards used to open a seller's account. Two name cards are in the foreground ahead of two check-in ticket cards. The truck-charges card is in the background.

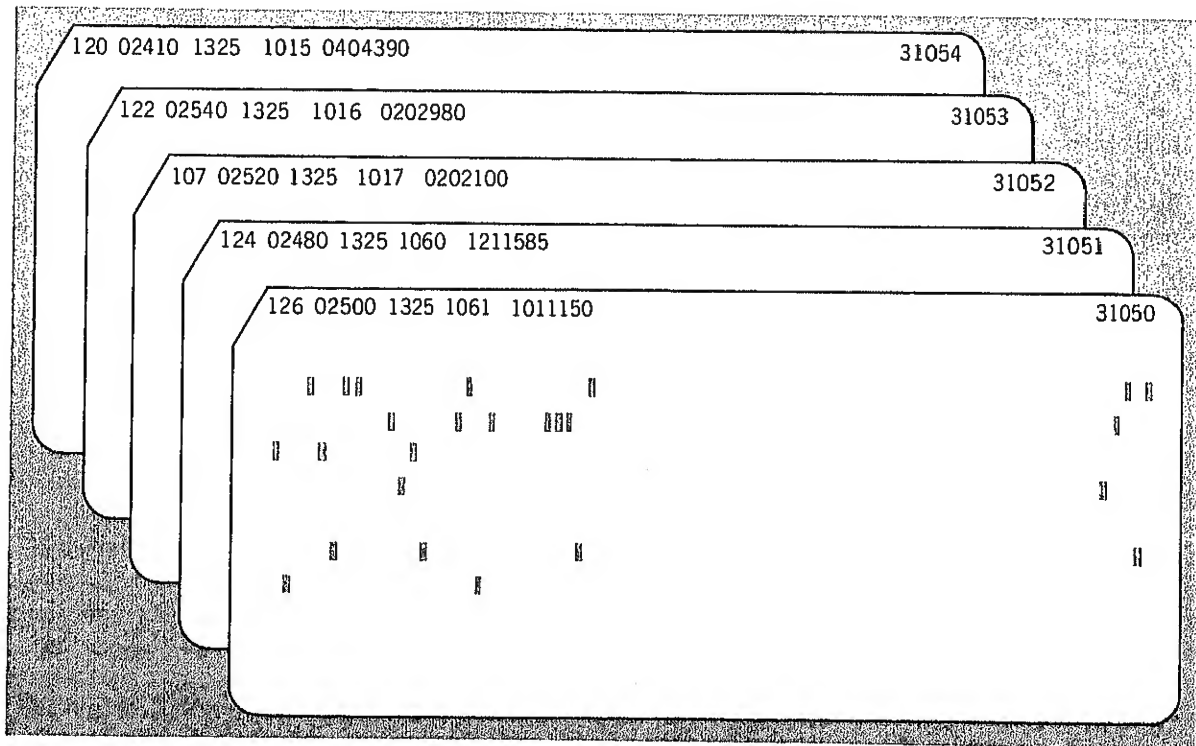


Figure 4.—Example of punched scale tickets.

After the sales information has been punched in the scale ticket card, the cards are inserted in a keypunch verifier, and all of the punched information is verified.

When the scale tickets arrive at the office, with the third copy of the check-in ticket, the keypunch operator can determine whether or not special charges for feed or veterinary service are to be made against the seller. These charges are listed on the third copy of the check-in ticket which has been retained in the yard with the livestock until they enter the sales ring. If special charges are to be made, they are punched on standard punchcards and inserted in the card reader before insertion of the scale tickets for the seller's account.

Scale tickets are inserted in the card reader after verification. Information from the punched cards is read into the computer. The number of head of livestock belonging to each seller account is tabulated internally in the computer as each scale ticket is processed. Whenever the number of head sold for a seller's account matches the number of head checked into the market under this account number, the computer automatically prints out a seller's invoice and a check payable to the seller.

Preparing Records and Accounts

The seller's invoices are printed out on a three-copy invoice form used by the market. Information printed out on the invoices includes seller number, name, address, check-in data, and sales data. The check-in data lists the number on each check-in ticket, date and time the livestock were received, the head on each check-in ticket, seller number, and the total number of head checked into the market. Sales data printed out for each draft sold include the scale ticket number; number of head; a description of the livestock; the buyer number; pen number where each draft was penned after being sold; total and average weight; a code letter indicating whether livestock were sold by weight, head, or pair; price; gross sales; commission rate; commission amount; and net sales. Deductions are listed below the totals for the scale tickets processed. Deductions are made when applicable for Livestock and Meat Board, inspection, feed, veterinary service, and truck charges. These deductions are made from the total amount of net sales. The balance due the seller is printed at the bottom of the invoice. An example of a seller's invoice is shown in figure 5.

Checks are written on the console typewriter of the computer for the balance due and payable to the seller. Checks are also written for any trucking charges. In case

of duplicate ownership of the livestock, checks are written according to the proportional amount listed on the name cards.

Buyers' statements are printed on request. This is accomplished by entering a punched card which contains the buyer's name, address, and buyer number. This punched card is entered in the card reader and must be preceded by either (1) an output and close card or (2) an output and no-close card. These cards contain a three-letter alphabetic code and the buyer number.

The output and close card provides a means for closing any buyer's account. The output no-close card provides a means to print out a sample statement of an account without closing this account.

Information printed out on the buyer's statement includes buyer number, name, address, and a detailed listing of drafts purchased. Sales data on each draft sold include scale ticket number; number of head; description of livestock sold; seller account number; pen number where livestock is penned; total and average weight; code letter indicating whether livestock was purchased by weight, head, or pair; gross sales; and net sales. Below the listing of drafts purchased is an overall total of the number of livestock purchased, the total weight, average weight, average price, gross sales, and net sales. Any special charges for buyer commission, feed, veterinary service, or trucking are added to the above net-sale total to provide the overall amount the buyer owes the market. An example of a buyer's statement is shown in figure 6.

Special Features of System

Several features are incorporated in the computer program to handle special cases involving invoices and statements. Provisions are made to reduce the number of head checked in after this information has been entered into the computer. This is a killed head card. It contains the seller's account number and the number of head to be subtracted from or added to the total number checked in.

Scale tickets or check-in tickets can be deleted by punching a card with the scale ticket or check-in ticket number included along with the buyer or seller account number. When these cards are processed, the computer system has no record of the affected ticket.

Name and address, trucking charges, feed charges, buyer commission, and veterinary charges can be deleted. This is done by punching a card that includes a three-letter code and the buyer or seller account number. When this card is processed through the card

reader, the computer deletes all entries of this type in the account specified. All charges which were correct must be reentered after the delete card is processed.

Occasionally, buyers will transfer scale tickets from one account to another. This can be accomplished by punching the code letters "XST" in the first three columns of a standard card. The scale ticket number to be transferred, the number of the buyer who previously owned the livestock, and the number of the new buyer are punched in other columns of the card. When the card reader scans this card and the information is processed by the computer, the above transfer will be made. Buyers use this service to complete a truckload lot of livestock or to transfer certain types of livestock to other accounts after the sale is completed.

Preparing Daily Summaries

When the day's sale is completed and all sellers' and buyers' invoices and statements are printed, a summarization of the day's activities is made by the computer. This summarization includes a condensed printing of each seller's invoice and buyer's statement (shown in figs. 7 and 8), a list of buyers and their account numbers, check reconciliation record, daily market information, and a summary. The condensed listing of each seller's invoice does not include the check-in ticket information. The check register record is a listing of all checks written and includes check numbers, payee, and the amount of the check.

The summary matrix (fig. 9) is a tabular listing of the dollar volume for sellers and buyers under the three species—sheep, cattle, and hogs. Listed under sellers and

buyers is the total dollar volume for livestock sold or purchased, Livestock and Meat Board, inspection, yardage, commission, trucking, feed, and veterinary service. This summary matrix represents the volume of business done by the market on that particular day.

The daily summary also contains a listing of the total number of head of each species sold based on the different commission rates as charged by the market. This provides the market with a detailed breakdown of the source of its revenue.

The total number of livestock sold of each species is also listed. The daily high price for each species and the weight of the livestock that brought this price are also listed.

The movement of check-in tickets from the unloading area to the office is through a pneumatic tube. Information is moved from the sales ring to the office through a pneumatic tube. This provides for the swift movement of all sales data to the office so the data can be punched on cards and fed into the computer.

The computer is also used by the market for the processing of its payroll, check reconciliation, general market accounting, and other market records. The check reconciliation is accomplished by punching a card automatically at the same time that the daily listing of checks is printed. The same information that is printed in the listing is punched on the cards. When the checks have cleared the bank, they are inserted into a keypunch machine and specific information is punched in the check, which is the same size as a standard punchcard. The checks and the punched card are processed through the computer, which prepares a listing of the checks that have not cleared through the bank.

CONCLUSIONS

The research reported here was concerned with developing the most efficient system for handling all sales transactions that occur in a livestock auction market. In this regard, the computer system has the following advantages over methods conventionally used in processing data on livestock markets:

1. Minimizes the possibility of error in computations and preparation of records and accounts.
2. Speeds up payment for animals following their sale.
3. Provides accurate permanent records of all business transactions.
4. Reduces clerical labor by handling routine accounting tasks, such as payrolls.

5. Provides buyers with rapid tabulations of livestock they have purchased while sale is in progress.

The use of a computer to process invoices and statements may not reduce the number of office employees, but it will reduce the number of total hours these employees have to work. A considerable saving of time occurs in the balancing out of each day's sales activity. The daily summary of a large sale day may require 10 to 12 man-hours to complete using conventional electric desk calculators. The computer can complete this summary within 15 to 20 minutes.

Precise data on savings that might result from the use of a computer system for processing sales data on a livestock auction market have not been determined. This would require another study.



CENTRAL MO. LIVESTOCK AUCTION, INC.

MEXICO, MISSOURI
Phone JU stice 1-2250



"Progressive Livestock Marketing - Aggressive Livestock Merchandising"

SELLER NUMBER 3184

27

800077 SOLD ED SNODGRASS 1/2
FOR ACCOUNT OF R R 3
FULTON MO
POST OFFICE MORTIMER 1/2
FULTON MO

CURRENT DATE

MO. DAY YR.
02 26 68

CHECK-IN NUMBER	DATE RECEIVED			TIME IN			TOTAL HEAD	SELLER NUMBER
	MO.	DAY	YEAR	HR.	MIN.	A.M./P.M.		
28184	02	26	68	4	0	PM	32	3184
TOTAL NUMBER OF HEAD CHECKED IN								32

TICKET NUMBER	NO. OF HEAD	DESCRIPTION	BUYER SELLER	PEN NUMBER	WEIGHT	AVG. WEIGHT	*	PRICE	GROSS SALES	COMM. RATE	COMM. AMOUNT	NET SALES
42690	2	HMP/BCH/	2250	249	384	192	W	19.25	73.92	0.75	1.50	72.42
42691	2	HMP/BCH/STK/	2206	244	272	136	W	16.35	44.47	0.75	1.50	42.97
42692	5	HMP/BCH/	2250	249	1002	200	W	19.60	196.39	0.75	3.75	192.64
42693	2	HMP/BCH/	2206	244	410	205	W	19.05	78.10	0.75	1.50	76.60
42694	1	HMP/BCH/SOW/	2206	244	254	254	W	18.20	46.23	1.15	1.15	45.08
42695	11	HMP/BCH/	2206	244	1880	171	W	16.85	316.78	0.75	8.25	308.53
42696	1	HMP/BCH/	2203	65	216	216	W	14.10	30.46	0.75	0.75	29.71
42697	1	HMP/BCH/	2240	340	280	280	W	19.00	53.20	0.75	0.75	52.45
42698	2	HMP/BCH/	2250	249	566	283	W	18.10	102.45	0.75	1.50	100.95
42699	4	HMP/BCH/STK/	2206	244	322	80	W	12.00	38.64	0.75	3.00	35.64
42700	1	HMP/BCH/STK/	2206	244	1	1	H	0.85	0.85	0.75	0.75	0.10
	32	TOTAL NUMBERS			5587	174		17.57	981.49		24.40	957.09
		MEAT BOARD										0.32
		INSPECTION										1.28
		FEED					F					1.80
		T D ATKINSON					F					10.00

PD. BY CHECK NO.	* TRANSACTION CODES	BALANCE	TOTAL/NET AMOUNT
202305	W- CWT. SALE H- HEAD P- PAIR		943.69

National Live Stock and Meat Board Fund is to promote the welfare of the livestock industry. If you object to this charge and advise us within 60 days the amount will be refunded.

LICENSED AND BONDED MARKET

"SEE'M WEIGHED ELECTRONICALLY"

Figure 5.—Example of a seller's invoice.



CENTRAL MO. LIVESTOCK AUCTION, INC.

MEXICO, MISSOURI
Phone JU stice 1-2250



18

"Progressive Livestock Marketing - Aggressive Livestock Merchandising"

BUYER NUMBER 2292

99

BOUGHT/SOLD FOR ACCOUNT OF JIMMY MARTENA
RUSH HILL MO

CURRENT DATE

MO. DAY YR.
022688

POST OFFICE

CHECK-IN NUMBER	DATE RECEIVED			TIME IN			TOTAL HEAD	SELLER NUMBER					
	MO.	DAY	YEAR	HR.	MIN.	A.M./P.M.							

TICKET NUMBER	NO. OF HEAD	DESCRIPTION	BUYER SELLER	PEN NUMBER	WEIGHT	AVG. WEIGHT	*	PRICE	GROSS SALES	COMM. RATE	COMM. AMOUNT	NET SALES
45029	6	HMP/STK/VAC/	2799	204	300	50	W	32.50	97.50			97.50
45025	7	HMP/STK/VAC/	2797	204	370	53	W	30.50	112.85			112.85
45108	25	HMP/WHT/STK/VAC/	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
*****	*****	*****	2830	204	1580	63	W	32.75	517.45			517.45
45115	8	WHT/STK/VAC/	2829	204	325	41	W	37.50	121.87			121.87
45192	9	RED/STK/VAC/	2867	204	510	57	W	27.00	137.70			137.70
	55	TOTAL NUMBERS			3085	56		32.01	987.37		0.00	987.37
	55	ROY DILLARD					H	0.20				11.00
		VETERINARY										6.30
		VETERINARY										5.40
		VETERINARY										27.50
		VETERINARY										7.20
		VETERINARY										8.10

PD. BY CHECK NO.	* TRANSACTION CODES W - CWT. SALE H - HEAD P - PAIR	BALANCE TOTAL/NET AMOUNT ▶	1,052.87
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National Live Stock and Meat Board Fund is to promote the welfare of the livestock industry. If you object to this charge and advise us within 60 days the amount will be refunded.

LICENSED AND BONDED MARKET

"SEE'M WEIGHED ELECTRONICALLY"

Figure 6.—Example of a buyer's statement.

SELLER INVOICES FOR 022668

20

SELLER NUMBER 1290

GEORGE SEE
MINEOLA MO

18603	2	W F/STR/	108	1865	932 W	23.20	432.68	3.75	7.50	425.18
18602	1	W F/STR/	106	945	945 W	21.35	201.76	3.75	3.75	198.01
18604	1	W F/STR/	122	995	995 W	24.10	239.79	3.75	3.75	236.04
18599	2	BLK/STR/	102	1695	847 W	22.70	384.76	3.75	7.50	377.26
18601	3	BLK/STR/	106	3030	1010 W	23.60	715.08	3.75	11.25	703.83
18600	1	BLK/STR/	104	1085	1085 W	22.80	247.38	3.75	3.75	243.63
	10	TOTALS		9615	961	23.10	2,221.45		37.50	2,183.95
		MEAT BOARD								0.30
		INSPECTION								0.40
		FEED				F				3.00
		KNOEPFLEIN				F				40.00
							BALANCE			2,140.25

SELLER NUMBER 1291

GARLAND SCHULL
PARIS MO

18635	1	W F/COW/	994	1895	1895 W	22.10	418.79	3.75	3.75	415.04
18633	1	COW/	107	1665	1665 W	17.00	283.05	3.75	3.75	279.30
18634	1	COW/	107	1285	1285 W	16.30	209.45	3.75	3.75	205.70
18632	1	COW/	112	1190	1190 W	16.50	196.35	3.75	3.75	192.60
	4	TOTALS		6035	1508	18.35	1,107.64		15.00	1,092.64
		MEAT BOARD								0.12
		INSPECTION								0.16
		FEED				F				3.00
		MOREHEAD				F				12.00
							BALANCE			1,077.36

SELLER NUMBER 1293

MELAINA GAW
R R 3
ASHLAND MO

18611	5	W F/HFR/	104	4075	815 W	24.30	990.22	3.75	18.75	971.47
18609	4	BLK/HFR/	103	3235	809 W	23.20	750.52	3.75	15.00	735.52
18607	1	BLK/HFR/	120	800	800 W	24.10	192.80	3.75	3.75	189.05
18608	1	BLK/HFR/	104	750	750 W	23.80	178.50	3.75	3.75	174.75
18610	10	BLK/HFR/	124	8420	842 W	23.40	1,970.28	3.75	37.50	1,932.78
	21	TOTALS		17280	822	23.62	4,082.32		78.75	4,003.57
		MEAT BOARD								0.63

Figure 7.—Summary listing of seller's invoices for the records of the livestock market.

BUYER INVOICES FOR 022668

21

BUYER NUMBER 1001

BAKER PACKING COMPANY
HWY 22 W
MEXICO MO 65265

18636	2	STR/	1	2115	1057 W	26.80	566.82		566.82
	2	TOTALS		2115	1057	26.80	566.82	0.00	566.82
		FEED				F			17.25
		FEED				F			3.38
		FEED				F			3.32
		FEED				F			3.38
							BALANCE		594.15

BUYER NUMBER 1002

BAKER PACKING CO
HWY 22 W
MEXICO MO 65265

18609	4	BLK/HFR/	103	3235	809 W	23.20	750.52		750.52
18616	2	BLK/HFR/	103	1685	842 W	23.40	394.29		394.29
	6	TOTALS		4920	820	23.27	1,144.81	0.00	1,144.81
							BALANCE		1,144.81

BUYER NUMBER 1003

BAKER PACKING CO
HWY 22W
MEXICO MO 65265

18635	1	W F/COW/	994	1895	1895 W	22.10	418.79		418.79
18626	1	W F/BUL/	992	1140	1140 W	20.90	238.26		238.26
18629	1	BLK/BUL/	993	1405	1405 W	21.90	307.69		307.69
	3	TOTALS		4440	1480	21.73	964.74	0.00	964.74
							BALANCE		964.74

BUYER NUMBER 1005

WITTE BROS EXC
TROY MO

18603	2	W F/STR/	108	1865	932 W	23.20	432.68		432.68
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Figure 8.—Summary listing of buyers' statements for the records of the livestock market.

SUMMARY OF ACTIVITIES FOR 022668

22

	S H E E P		H O G S		C A T T L E	
	SELLER	BUYER	SELLER	BUYER	SELLER	BUYER
TOTL	3,207.24	3,207.24	85,567.97	85,567.97	33,446.46	33,446.46
MTBD	1.50	0.00	26.93	0.00	4.38	0.00
INSP	6.84	0.00	109.08	0.00	5.84	0.00
YARD	61.20	0.00	975.00	0.00	268.15	0.00
COMM	53.55	7.50	1,118.10	24.10	259.50	0.00
ADV	0.00	0.00	0.00	0.00	0.00	0.00
TRUK	10.00	0.00	134.07	101.35	89.00	0.00
FEED	0.00	0.00	108.95	33.85	45.25	93.73
VET	0.00	0.00	0.00	1,567.60	0.00	0.00

COMMISSION DISTRIBUTION

0 REGISTERED CATTLE SOLD
 23 CATTLE AT CARLOAD RATE
 0 COWS WITH CALVES
 3 BULLS OVER 800 LB.
 119 BULLS UNDER 800 AND OTHERS OVER 450
 1 OTHER CATTLE UNDER 450 LB
 146 TOTALS

 174 SHEEP ALL CLASSES

 89 HOGS AT CARLOAD RATE
 57 SOWS WITHOUT LITTER
 9 BOARS OVER 250 LB
 2592 BOARS UNDER 250 AND BUTCHER HOGS
 40 SOWS WITH LITTERS
 2787 TOTALS

VOLUME BY CLASS

TOTAL CATTLE SOLD 146
 TOTAL SHEEP SOLD 174
 TOTAL FEEDER HOGS SOLD 1652
 TOTAL BUTCHER HOGS SOLD 1135

TODAYS HIGH

	PRICE	AVE WT	HEAD	SELLER
CATTLE	27.00	700	1	1300
	27.00	700	1	1302
SHEEP	27.75	96	7	4872
FEEDER HOGS	45.00	55	17	2808
BUTCHER HOGS	20.45	186	11	3218

Figure 9.--Daily summary of sales activity.

APPENDIX

The mechanical procedures of setting up a computer system are explained in the following three sections.

Card Formats and Functions

The format of each of the 18 cards used in the automated program for a livestock auction market is described in detail in the following discussion. The columns on a standard 80-column punched card, which must be punched to enter the described data in the auction program, are listed for each type of card.

1. Advance to Seller Card

Col. 1-3 "ADV"
5-9 Amount of Advance
12-15 Seller number of account charged

This card is used to charge an account for money drawn before the livestock involved are sold. No check is written by the computer; it only credits the account for the amount drawn.

2. Advance Check Number

Col. 1-3 "ACK"

This card will void the next check number in the check register and add one to next check number word. The console printer will not be changed. All changes must be manual.

3. Buyer Commission Card

Col. 1-3 "BCM"
18-21 Buyer number to charge for commission
22 Type of commission (F, W, H)
24-29 Amount to use in calculating commission
38-61 Name for payee field of check

This card is used when the livestock auction is authorized to pay the buyer commission and charge it to the company buying the livestock. The commission amount is added to the total owed the livestock auction, and a check is written to the agent of the buying company.

4. Check-in Ticket Card

Col. 1-3 "CIT"
5-9 Check-in ticket number
12-15 Seller number
18-21 Check-in time
22 "A" or "P" for a.m. or p.m.
24-29 Check-in date
31 Number of days to feed at 6 cents per 100 lb.
32 "M" when no Livestock and Meat Board is to be charged

33 "1" when no inspection is to be charged

34-36 Number of head checked in

This card must be input before the livestock are sold or an error code 2-13 will be displayed. This card tells the computer how many animals were checked in and how many days they should be fed. The seller number is the last three digits of the smallest check-in ticket opened by this seller preceded by the type livestock identifier, "1" for cattle, "2" for feeder pigs, "3" for butcher pigs, and "4" for sheep. Other items of the check-in ticket are self-explanatory.

5. Dump Disk

Col. 1-3 "DMP"

This card causes the program to examine each account stored on disk. All accounts which have not been closed will be printed on the system printer. In each case, the word "balance" will be preceded by the word "sample" to indicate that the account is still open. No checks will be written by the dump program. After all accounts have been scanned, the program prints instructions for the operator. The operator has the choice of going back to the auction program, going to the summary program, or giving control back to monitor.

6. Exchange Scale Ticket From One Buyer to Another

Col. 1-3 "XST"
5-9 Scale ticket number to be exchanged
12-15 Buyer who previously owned livestock
18-21 New buyer

This card will cause a selected scale ticket to be transferred from one account to another. Before this card can be used, all accounts affected must be open. Error messages for this operation refer to the "From" and "To" field of the card. "From" is the previous owner (col. 12 through 15) and "To" is the new owner (col. 18 through 21).

7. Exit This Program

Col. 1-4 "EXIT"

The common information area and other important information is written on disk, and then control is rendered back to the monitor system. To restart the auction system, an XEQ PRG02 card must be input. The computer will automatically stop with a message which is normal and should be expected. The program start twice.

8. Feed Charges to be Added to an Account

Col. 1-3	"FEE"
5-9	Amount or rate for calculations
12-15	Seller number, if seller to be charged
18-21	Buyer number, if buyer to be charged
22	Type of charge (F, W, H)
24-25	Number of days to be fed
26-29	Number of head to be fed

This card will place a feed charge on the statement of a buyer or invoice of a seller and add the amount charged to the feed charges for the day. Feed charges may also be entered by using column 31 of the check-in ticket. If it is desired to feed all animals listed under this account, the letters "all" may be punched in columns 26 through 28.

9. Killed Head

Col. 1-3	"KHD"
5-9	Number of head to be subtracted from number checked in
12-15	Seller number

This entry will cause the total number of head checked in to be decreased with the word "less" and the number of head printed in the check-in block of the invoice. There are no charges generated with this card. It only reduces the number of head checked in.

10. Name and Address Card

Col. 1-3	"NAM"
5-6	Proportion numerator
7	"/" proportion divider
8-9	Proportion denominator
12-15	Seller number if a seller account
18-21	Buyer number if a buyer account
22-80	Name and address, must have three "/"

A seller account must be opened with a name card. The buyer account can be opened either by a name card or a scale ticket with the buyer number. Columns 5 through 9 are used only when more than one person has an interest in livestock being sold. All proportion figures must be right, justified with preceding zero's punched in order to be valid. If the proportion does not add up to one, a check will be written to Central Missouri Livestock Auction, Inc., and the checks will have to be written manually. One name card is required for each party with an interest in a particular account. When more than one name card is used, it is advisable to use the name followed by three "/" except for the last name entered which may have the address included. A name followed by three "/" will only print one line, thus saving space

on the invoice or statement. The name card of an account must precede all other entries or an error code 5-14 will be displayed.

11. Output and Close

Col. 1-3	"OAC"
12-15	Seller number (for reopened or adjusted accounts)
18-21	Buyer number

This card provides a means of closing any buyer's account and any seller's account which has been reopened for some reason. The account closed bit (part) of the account is set at the conclusion of this program. The only way to change data in this account after it is closed is to reopen it. This card may also be used to close a seller's account which has been changed with pull cards.

12. Output No Close

Col. 1-3	"ONC"
12-15	Seller number
18-21	Buyer number

This card provides a means to sample an account which is on the disk without closing it. The status of the account is not changed when using this card. Again, the word "sample" will be placed before the balance to indicate that the account is still open.

13. Pull Scale Ticket

Pull Check-in Ticket

Col. 1-3	"PST" or "PCI"
5-9	Scale ticket or check-in ticket number
12-15	Seller number
18-21	Buyer number

The use of either of these cards will cause one scale ticket or check-in ticket to be deleted from the disk. When the operation is complete, the system has no record of the affected ticket. All affected accounts must be open before either type of ticket can be deleted.

14. Pull Advance Tickets (PAV)

Pull Buyer Commissions (PBC)
 Pull Feed Tickets (PFD)
 Pull Name and Address (PNA)
 Pull Trucking (PTK)

Col. 1-3	"P.."
12-15	Seller number
18-21	Buyer number

Each of the above cards will delete all entries of that type in the account specified. For example, a PFD 1250 card will delete all feed entries in account 1250, including those entered by using the check-in ticket column 31. All accounts must be open before an entry

may be deleted. All charges which were correct must be reentered after the pull card is used.

15. Reopen an Account

Col. 1-3 "RPN"
 12-15 Seller number
 18-21 Buyer number

This card will reopen any account which has been closed. The totals of the day are adjusted to reflect this account as being open. The account must be closed to make the totals of the day correct.

16. Scale Ticket

Col. 1-3 Pen number
 5-9 Price
 13-15 Seller number
 19-21 Buyer number
 22 Number of units
 23 Over 100 head flag
 24-25 Number of head plus column 23
 26-30 Total weight
 31 Cattle description
 32 Sheep description
 33 Hog description
 35 12 punch indicates a master card
 36 11 punch indicates a slave card
 37 12 punch indicates sale by head

All entries from columns 1 through 30, except 22 and 23, must be numbers rather than letters. Preceding zeros are required in all fields used. If a zone punch is present in column 22, the following amounts are added to the amount punched in row 1-9: 12 punch add 10, 11 punch add 20, 0 punch add 40. Any combination of zone punches is acceptable. A 12 punch in column 23 indicates the need to add 100 to columns 24 through 25. Any combination of zone punches within one description is acceptable, but it is not acceptable to punch in two different columns. A 12 punch in column 35 indicates the presence of a master card to be followed by a slave card with an 11 punch in column 36. The slave card must be the next sequential ticket number. A slave card only requires an entry in the weight and ticket number fields.

17. Trucking Ticket

Col. 1-3 "TRU"
 12-15 Seller number
 18-21 Buyer number
 22 Type of charge (F, W, H)
 24-29 Amount or rate for calculations
 34-37 Number of head transported
 38-61 Name of trucker

With the use of this card, the computer will generate a check payable to the trucker and subtract this amount

from the gross of the seller. The trucker's check will be generated at the same time the seller's invoice is printed. If a transporter wishes to ship all his animals at one rate and all by one vendor, the letters "all" can be placed in columns 34 through 36, and the computer will calculate the charge using the total number of animals owned.

18. Veterinary Charges

Col. 1-3 "VET"
 5-9 Amount
 12-15 Seller number
 18-21 Buyer number

All charges entered by using the veterinary card are flat charges. No check is generated and a total of all veterinary charges for the day is included in the daily summary.

Card Arrangements for Specific Procedures

The Automated Auction System is a card controlled system. This means that the arrangement of input cards is very important. The programs have been written to make card sequences as logical as possible. For this section, the type of operation will be listed with the proper arrangement of cards to complete this task and concluded by a brief explanation as to why the cards must be in this order.

System Initialization:

- A. Cold start card
- B. JOB card
- C. XEQ PRG01 card
- D. A NAM card to open an account
- E. The rest of the data deck to be processed.

The cold start card is to initialize the monitor system which controls all disk input-output operations. The JOB card is to prepare the computer to start a new task. XEQ PRG01 (Program No. 1) will cause the computer to initialize all accounts and set up for a new day's run. This program will also request the operator to input the current date and the first check number to be used. The current date and check number are fed into the computer using the console typewriter. The NAM card is used to open an account and after the system is initialized, no accounts are open; so the first order of the day is to open the accounts. No adjustments can be made until the account is open.

Account Generation:

- A. NAM card
- B. CIT card (seller accounts only)
- C. All charges against the account
- D. Mark sense scale tickets
- E. OAC (buyer and reopened seller accounts only)

It is assumed that the system has been initialized. The NAM card will open the account and reserve one disk sector to store all update information. The CIT is used to validate certain information input by other cards, and for this reason should be input as soon as possible. All other charge cards are simply stored in the sector reserved for this account so the order of input is not important. In most cases, the scale ticket will be the last input into an account. All charges must be input before the last scale ticket of the seller consignment is entered, for the invoice is automatically output when the seller has sold all animals checked in. The scale ticket will also automatically open a buyer sector, if one is not in existence. The scale ticket may also be punched manually using the format described under "Card Formats and Functions," item 16 "Scale Ticket." An OAC card is the only way to close a buyer's account.

Entry Type Deletion:

- A. P-card
- B. All valid cards of the type deleted
- C. Continue with auction cards

This type of pull operation is limited to PAV, PBC, PFD, PNA, and PTK. These cards will delete all entries of the particular type specified. For example, the PAV card will delete all advance entries that have been entered in the specified account. If there are valid entries which would be deleted, they must be reentered. Care must be exercised in using the PFD (pull feed) card. There are two ways to enter a feed charge into an account: (1) By including it in the check-in ticket, and (2) by using a FEE card. When the PFD card is used, both types of feed charges will be deleted. The check-in ticket cannot be used to reenter a feed charge, as a duplicate check-in ticket would cause many additional problems.

Single Card Deletion (PST, PCI):

- A. P-card
- B. Corrected scale ticket or check-in ticket
- C. Continue with auction cards

Only two types of pull cards (PST and PCI) will delete single card entries. The particular card to be deleted is located by either the check-in ticket number or scale ticket number. Only one card image is affected. The corrected card may be placed after the pull card if it is desired to change one of these cards.

Terminate Processing and Save Data:

- A. EXIT card
- B. Two blank cards

The EXIT card will save all tables and accumulators on disk and transfer control back to disk monitor so the computer can be used for other tasks. As soon as the EXIT card has been used and returned to the stacker, the disk cartridge should be removed from the computer. Many disk monitor programs use the same disk area as the Automated Auction System, in which case the auction data would be lost. If the auction data are lost, the sale can be recreated by rerunning all punched cards for that day.

Restart Auction in Progress:

- A. JOB card
- B. XEQ PRG02 card
- C. Auction data

The JOB card tells the computer to prepare for a new task. The XEQ PRG02 card instructs the computer to load the program which reads automated auction cards. From this point on, normal operating procedures are followed.

The XEQ PRG02 (Program No. 2) causes the computer to load the program which reads automated auction cards. This program is used to read, process, and file cards containing the following information: Name and address; check-in ticket; charges for trucking, feed, and veterinary services; advances; scale tickets; output requests through a linkage to the output program; and deletion of a transaction through a linkage to the program for deleting transactions from the disk file.

A table of symbols and constants is included in this program. The animal description code and the rate of

charges for inspection and the Livestock and Meat Board are included in this table.

The yardage and commission rates charged by the market are described in detail and stored in this table.

Manually Start Summary Program:

- A. JOB card
- B. XEQ Sumup card
- C. 3 blank cards

The JOB card tells the computer to get ready for a new task. The XEQ Sumup card tells the computer which task to start. Once the program is called in from disk it will communicate with the operator through the console printer. The three blank cards are for pre-positioning cards for the card punch. Even though the check reconciliation cards will not be punched, these cards are required. The sequence of output of the summary program is:

- a. Seller condensed invoice listing
- b. Buyer condensed statement listing
- c. Financial matrix with commission distribution
- d. Check reconciliation listing or punching or both
- e. Listing of current day's buyers

Sample Section of Flow Chart

The section of the flow chart shown in figure 10 illustrates the type of flow chart prepared before writing the computer program. This is only a sample of the total program flow chart, which covers approximately 140 pages.

This sample flow chart represents the final step in the printing of one scale ticket on an invoice. The decision point in this flow chart is diamond shaped. At each diamond the computer must make a "Yes" or "No" decision before proceeding. These decisions are based on the information punched on the card being read. Other items in the flow chart are general information or instructions to the computer. When the computer has followed the instructions and made the decisions on this page, it will print one line.

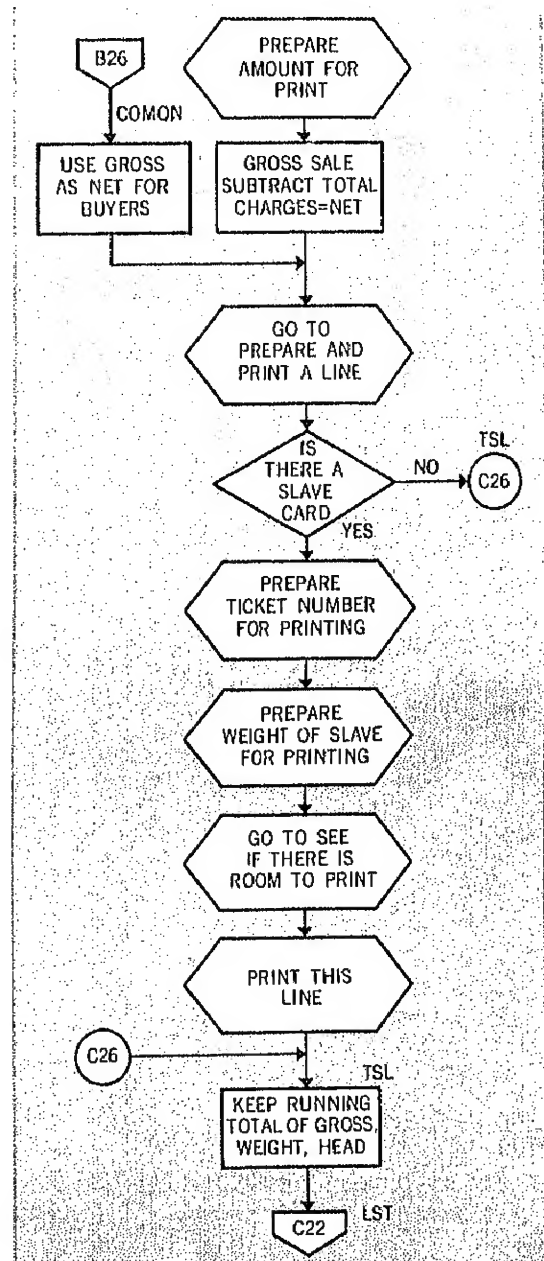


Figure 10.—Sample section of flow chart.